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| Title | Electrical and room temperature multiferroic properties of polyvinylidene fluoride nanocomposites doped with nickel ferrite nanoparticles | | |
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| Abstract: Flexible multiferroic polyvinylidene fluoride (PVDF) nanocomposites doped with nickel ferrite (NFO) nanoparticles were synthesized successfully by using a simple wet chemical method. A two-stage synthesis method is used to develop PVDF–NFO nanocomposite films. In the first stage, the NFO nanoparticles are synthesized, then the NFO nanoparticles are incorporated into the PVDF matrix to form polymer nanocomposites. X-ray diffraction pattern analysis confirms the formation of polar β-phase which is responsible for the ferroelectricity in PVDF nanocomposites. The detailed analysis of electron transport properties suggests the correlated barrier hopping (CBH) conduction mechanism in the nanocomposites. The dielectric constant of the nanocomposites increases with the increase the NFO filler concentration in PVDF matrix as compared to pure PVDF film. The asymmetrical electric modulus spectrum of the nanocomposites is analyzed with the help of modified Kohlrausch–Williams–Watts (KWW) function. Magnetic, ferroelectric and magneto-dielectric coupling measurements confirm the room temperature multiferroic properties of PVDF–NFO nanocomposites, enhancing their application potential in the field of flexible electronics.  Graphical abstract: Electrical and room temperature multiferroic properties of polyvinylidene fluoride nanocomposites doped with nickel ferrite nanoparticles |  |
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